Attachment to W.P. #DRL-2009-10 Aug 10, 2009

PC1E Chamber module repair in the PHENIX Experimental Hall (bldg. 1008).

Problem

A broken wire in the upper most Pad Chamber 1 (PC1) East chamber module of the PC detector array has been detected, necessitating the replacement of the module. A spare module has been identified and tested and found to be in good working condition. During the 2009 shutdown, while the PHENIX East Carriage (EC) is in its shutdown maintenance position, the defective module is to be replaced with the spare. Module.

Access to this module, which resides in the PHENIX East Carriage (EC) on the EC interior side of the East Drift Chamber (DC) to which the PC1 East modules are attached. (See Figure 1) Replacement of the failed module requires more access than the existing range of motion of the DC/PC1 east assembly allows in its installed configuration. Consequently PHENIX engineering has designed a fixture to extend the range of motion of this assembly and thus allow sufficient access to remove the existing defective module and replace it with the good spare while not require complete removal of the DC. The fixture has been fabricated and is ready for service.

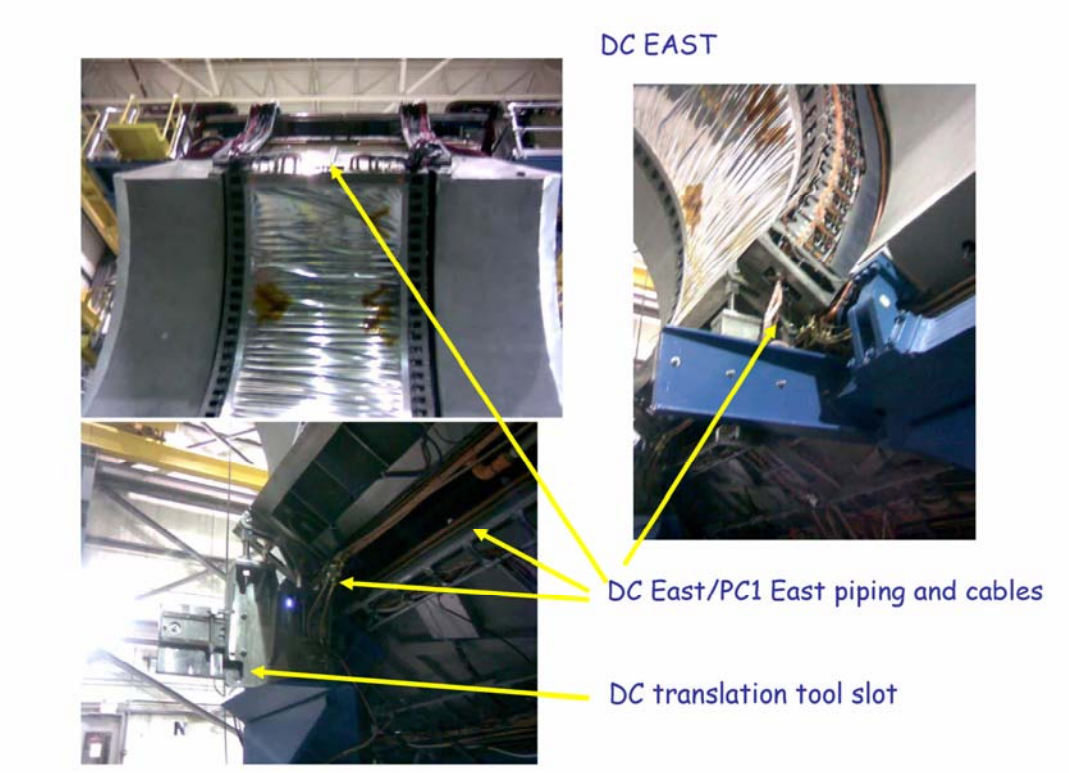

Figure 1: The DC East detector subsystem

The procedure by which this repair will be accomplished is provided below.

Work Plan

This work is to be done by fully trained and experienced personnel (PHENIX mechanical and electrical technicians and PC1 expert scientists) during the 2008 summer shutdown.

1. Preparation for repairs

- persons performing this work shall have PHENIX Awareness training, CA access training, BNL ladder training, manlift training (if working in manlift)and BNL working at heights training (if working in manlift) and basic electrical safety.

- prior to commencing work the EC shall have been moved into the PHENIX assembly hall (AH) and parked in its normal shutdown position as

- the PC1 repair tool (see Figure 2) shall be positioned as shown and fixed in position in accordance with PHENIX drawing number 105-0500-060, attached.

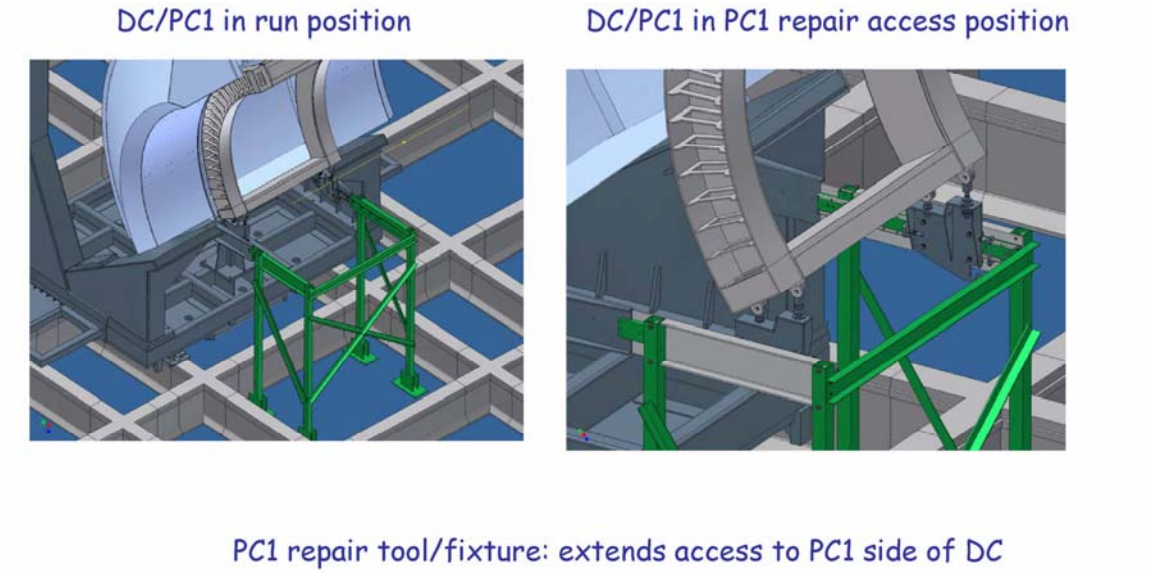

Figure 2: PC1 Repair Tool

- under direction of PHENIX DC experts, all cables and piping serving the DC east and PC1 east detector subsystems which would otherwise interfere with the intended repair task shall be disconnected and temporarily removed or relocated as appropriate.

- the AH Crane shall be attached by sling to the lifting tab at the top of the DC east support structure and the crane positioned so as to prevent the DC from moving past the end of the PC1 repair tool. In addition, the lower ends of the DC east support structure shall have restraining cables attached to the east carriage main structure in a manner that shall also prevent the DC from moving past the end of the PC1 repair tool. These constraints shall be examined and approved by the PHENIX chief engineer prior to moving the DC east, in the next step.

- the DC east translation stops shall be removed and the DC translating tool (see PHENIX drawing RD002-0501-156, attached) shall be used to move the DC west to its open position.

- apply appropriate clamps to lock the DC in the full open position.

2. Removal and replacement of failed module

- using 2 manlifts with lift operators wearing appropriate fall protection PPE shall be stationed at the north and south ends of the DC and elevated to the height of the failed PC1 module.

- carefully disconnect the failed module from its mounting bracketry and lift it over the DC and lower it to the floor

- lift the replacement PC1 module above the DC east and carefully place it into the mounting bracketry and secure it in place.

- reattach the PC1 cabling and perform appropriate electrical tests to verify cabling.

3. Final checks

- using DC translation tool, move the DC back to its normal run position.

- re-test PC array to verify that all PC1 modules are operating correctly

5. Work conclusion

- remove the clamp securing the DC in the open position.

- carefully push the DC translation thrust bar westward to slowly move the DC/PC1 approximately 10 inches until it contacts its run position stops.

- re-install the run position retaining clamp

- remove the DC translation tool from the tool retaining slots and return it to storage for future use.

- restore all wiring and piping to its pre-repair condition.

- test and verify DC east to assure that cables and piping have been restored properly

- dismantle and store the PC1 repair tool for future use.

- closeout work permit and note any anomalies, difficulties or general observations in the task performance.